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**Bookreview of Ways of Making and Knowing: The Material Culture of Empirical Knowledge by
 Pamela H. Smith; Amy R. W. Meyers; Harold J. Cook**

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Pamela H. Smith; Amy R. W. Meyers; Harold J. Cook (Editors). *Ways of Making and Knowing: The Material Culture of Empirical Knowledge*. (Bard Graduate Center Cultural Histories of the Material World.) xi + 430 pp., illus., table, bibl., index. Ann Arbor: University of Michigan Press, 2014. \$60 (cloth).

The notion of the “turn” has to manifest itself by stressing that everything it turns to is indeed textual, pictorial, performative, or—as is the case with the turn the series editor Peter N. Miller evokes in his preface to this volume as “surely being upon us”—material (p. vii). As a consequence, many publications that have addressed the material turn reiterate its origins, ambitions, and goals, while the actual impact of research into the meaning of materials lags behind. This volume, edited by Pamela H. Smith, Amy R. W. Meyers, and Harold J. Cook, the fourth in the Bard Graduate Center Cultural Histories of the Material World series, is a welcome combination of both: it addresses the overall theoretical impact of the material turn for the history of science and art, as well as presenting case studies that reflect the academic usefulness of the increasingly sensitive attention paid to the material world. The reason for this combination may be the rather long history of the book, which began in an interdisciplinary conference in 2005. Most of the fourteen contributions have benefited from the long seeding time and, as the footnotes show, have been updated to include references to publications up until at least 2011.

While most readers of edited volumes may be inclined to skip the introduction and move on to the contribution that connects to their area of interest and expertise, this one should not be missed. It beautifully frames the knowledgeable relation between the mind and the hand through the metaphor of the wisdom of Athena, which embodied both the “bright” knowledge of ideas and the “dark” knowledge of matter. More importantly, it presents an overview of the historiography of research into objects, materials, and practices that reaches far beyond sociological and anthropological theories of the 1990s (today’s familiar backbone of the material turn) and identifies earlier accumulations in the 1930s and 1970s. It also shows that the academic investigation into the history of materials has a political side to it, as it exposes the material conditions of the field itself, which today, when external funding and impact factors tend to outweigh originality of research, are as important as ever.

Of the fourteen contributions, two are more essayistic in nature. Suzanne B. Butters reviews the relation between skill and knowledge in Italian Renaissance art with the help of multiple examples; and Mary M. Brooks presents a view from inside the museum, illustrating with diverse British exhibitions up until 2008 how preservation can be conceptualized to think about decay as a natural and inspiring element of the material world. The remaining twelve contributions deal mostly with Northern European and some North American early modern material practices and objects and have carved out their historical contexts deeply. As such they present what Ken Alder, writing in this journal some years ago, called “thick things”; they answer to the “challenge of representing things in ways that at least partially and temporarily coordinate the diverse sets of human agents who design, make, and use them” (*Isis*, 2007, 98:80–83, on p. 82). From the unexpected relation between butter and mercury in metalsmithing treatises (Pamela H. Smith), to the intriguing history of the black dyestuff produced from logwood (Alicia Weisberg-Roberts), to the material practices arising from the testing of valuable substances and products for their quality (Patrick Wallis and Catherine Wright), and all the way to the use of oil of turpentine as a preservative for anatomical specimens (Harold J. Cook), the authors show how the study of substances and the objects produced from or with them yields a wealth of information on the relation between making and knowing. They also demonstrate the necessity that such research be interdisciplinary, productively connecting the history of science to that of art. With no fewer than five contributions on specimen boxes and vessels, artfully constructed cabinets, illustrated books, and lists, the volume has an implicit subfocus on the containers that keep, transport, display, and record salient substances and objects (Mark Laird and Karen Bridgman, Glenn Adamson, Joel T. Fry, Lisa L. Ford, Elizabeth Yale). Taken

together, the successful pursuit of the “thick thing” approach presented here should inspire researchers for some time to come.

With many high-quality color illustrations and a classic layout, *Ways of Making and Knowing* makes for enjoyable reading. The editors should also be complimented on their “tiny step” (p. xi) toward integrating new formats. They discuss and link to the reconstructions of Venetian glassmaking by Ian Hankey that took place at the initial conference in 2005 and were recorded on film. The integration of such visuals with the printed book is the next challenge for the material turn, asking as it does for a change in our very own material culture of publishing research results.

Ann-Sophie Lehmann

Sacha Stern; Charles Burnett (Editors). *Time, Astronomy, and Calendars in the Jewish Tradition*. (Time, Astronomy, and Calendars, 3.) xxi + 365 pp., illus., tables, bibl., index. Leiden/Boston: Brill, 2014. \$220 (cloth).

Time, Astronomy, and Calendars in the Jewish Tradition collects the published versions of papers presented at a conference under the same title at University College, London, in June 2012. Most of the contributors have been associated with any of several major London-based research projects on these topics.

The first few papers address the formative period of postbiblical and rabbinic literature. Jonathan Ben-Dov discusses the reception of 1 Enoch 82 in the Jewish communities of Egypt. Reimund Leicht argues that the rabbinical procedures for observation of the moon in the tractate *Rosh ha-Shanah* are more politically motivated than based on any detailed cosmological knowledge. By contrast, Katharina Keim shows that the Pirke DeRabbi Eliezer represents an advance in curiosity about the facts of nature.

The remaining nine contributions treat the medieval period. Some of them are brief synopses of forthcoming books and dissertations. François de Blois introduces us to the Islamic and Christian authors to whom we owe our earliest (ninth–eleventh century) information about the rabbinical calendar: Muḥammad b. Mūsā al Xuwārizmī, Ibn Bāmšād al Qā’inī, Abū l-’Abbās al-Faḍl b. Ḥātim an-Nayrīzī, Abū l-Ḥasan ‘Alī b. al-Husayn al-Mas’ūdi, Abū Rayḥān Muḥammad b. Aḥmad al-Bayrūnī, and Elias of Nisibis. Anne Kineret Sittig discusses her dissertation research on the *Sabbath Epistle* of Abraham Ibn Ezra, arguing that the letter should be understood within the context of debate between Jewish and Christian communities, rather than as a response to any particular text. Ilana Wartenberg presents excerpts from a forthcoming new edition of the book of Abraham bar Ḥiyya, comparing it with the work of Jacob bar Samson, which she argues was entirely independent.

Two of the articles are long and technically challenging analyses of astronomical data and instruments. Raymond Mercier discusses the astronomical tables of Abraham bar Ḥiyya dated to 1104 Sep 21 and a closely related set dated to 1110 Feb 28, based on the work of bar Ḥiyya but adjusted from the meridian of Syria to that of Toulouse. He shows how bar Ḥiyya extended the mathematics of the Jewish calendar by merging it with the work of Claudius Ptolemy and the Arabic astronomer al Battānī to produce a more comprehensive astronomical textbook. Josefina Rodríguez Arribas discusses Ibn Ezra’s treatise on the astrolabe, written in Hebrew both because knowledge of Arabic was receding within the Jewish community and because Jews wanted to make this fashionable instrument their own.

Two papers draw the reader’s attention away from concern solely for textual reconstruction toward the culture of the scribes. Marina Rustow and Sacha Stern discuss the calendar controversy of 921–922, when the rabbinical authorities of Iraq and Palestine disagreed on the date of 1 Tishri 921 and therefore also of Passover in 922. From the Genizah fragments the authors reconstruct the eleventh-century manuscripts that preserve the documents. They explain why the debate became of interest in the eleventh century but then disappeared from memory until rediscovered by nineteenth-century scholars.